ing the size or condition of the brain.—On muscular anomalies of the diaphragm; suggestions for a planispheric representation of the cerebral convolutions, by M. Duval.—On the disappearance of the more fitting in the struggle for existence, by M. Delauny. The author endeavours to show that superior as well as inferior species have disappeared, leaving only the intermediate species; the inferior having succumbed to the superior, while the latter have become extinct through sterility.—On the dog of the Tertiary period in Europe, by M. Zalorowski.—On the value of the information to be deduced from ancient Egyptian paintings by the naturalist, ethnographist, and historian, by M. Piétrement.—On a supernumerary nipple with mammary glands in a young woman, by Dr. Testut.—On the origin of right-handedness in man, by Mme. Clémence Royer.—On the symmetrical character in anomalies in man, and on the influence attributable to atavism in such anomalies, by M. Verrier.—On the geographic distribution of the Opatas, Pimas, &c., with an ethnographic chart of the Basin of the Rio Grande de Santiago, by M. E. T. Hamy.

Bulletin de la Société des Naturalistes de Moscou, 1883, No. 3.—History of the hypothesis of the cosmical waves proposed for explaining the forms of the comets, by Prof. Bredichin (with two plates), being a discussion of M. Schwedoff's hypothesis on this subject; and on some apparent anomalies in the structure of the tails of the comets, by the same (both in French). Prof. Bredichin arrives at the conclusion that, more than ever, he is right in affirming that the theory of repulsive forces is enabled to explain and to predict by means of calculus, not only the whole of the phenomena afforded by the comets and their leading features, but also the slightest details of their structure.—A reply of Dr. Morawitz to General Radoszkowsky's critics with regard to the Russian species of *Bombus* (in German).—On the *Pecten exc'sus* and *fyxidatus;* note by M. Ant. de Gregorio (in French).—Monopetal plants of Dr. Radde, being a continuation, in German, of Dr. Fred. von Herder's capital description of these plants.—Materials to the fauna of Russian Hemiptera, by W. Yakovleff; three new Russian species of *Odontarsus* and one *Emblethis tenellus* from Northern Persia are described (in Russian).—On the beans of *Abrus precatorius* compared with seeds of other Papilionaceæ, by Col. Tichomirow (in German), with two plates.—On the remains of *Edestus* and other fishes from the Lower Carboniferous of Moscow, by Prof. H. Trautschold (in German); the new species *Cymatodus reclinatus*, *Pœcilodus undatus*, and the new genus *Eucanthus margaritatus*, are described.—On the chief problem of higher geodesy, by Th. Sloudsky (with a plate); a mathematical discussion (in French) of the best means for determining the figure of the earth.—Letters from A. Regel from Central Asia.

Atti della R. Accademia dei Lincei, April 6.—Report on Alfonso di Legge's memoir on the length of the solar diameter, by S. Schiaparelli.—On the compressibility of fluids, and especially of water under temperatures varying from 0° to 99° C., and under pressures of from 1 to 4½ atmospheres, by Stefano Pagliani and Giuseppe Vicentini.—On the symbolic meaning of the Egyptian pyramids, by Dr. Ernesto Schiaparelli.—On the theory and classification of homographies in a linear space to any number of dimensions, by Dr. Corrado Segre.—On the equilibrium of flexible and rigid surfaces, part i., by Vito Volterra.—Remarks on the observations of the solar spots and faculæ made at the observatory of the Collegio Romano during the first quarter of 1884, by Pietro Tacchini.—On some transformations of orthonitroaniline and orthodiammine, by G. Koerner.—On the action of phtalic anhydride on pyrolignite, by G. L. Ciamician and M. Dennstedt.—On the molybdate of didymium, by Alfonso Cossa.—On the geological constitution of the Maritime Alps, by S. Capellini.—On some psychological difficulties which may be explained by the idea of the infinite, by Francesco Bonatelli.—Some fresh experiments with neurine, by Aliprando Moriggia.

Rendiconti del R. Istituto Lombardo, May 1.—Biographical notice of Prof. Giovanni Polli, part i., by Prof. Gaetano Strambio.—On a problem in mathematical analysis, by Prof. F. Brioschi.—Note on certain variations in the stem and blossom of *Gagea arvensis*, Schult, by Silvio Calloni.—On the struggle for existence between the *Staphylinus olens*, Müll., and the *Lumbricus agricola*, Hoffm., by the same author.—The Court of Cassation in connection with the question whether women should be admitted to the legal profession, by Prof. E. Vidari.—Meteorological observations made at the Brera Observatory, Milan, during the month of April.

Rivista Scientifico-Industriale, April 30.—On certain works required to be carried out in the Island of Ischia, in order, if possible, to prevent the disastrous consequences of future earthquakes, by Prof. Temistocle Zona.—Installation of the electric light in the railway station of Porta Nuova at Turin.—Considerations and suggestions regarding the adoption of earthenware tubes in underground telegraphs, by the engineers R. Fabri and G. A. Romano.—Obituary notice of Quintino Sella, with a list of his scientific writings, by Giuseppe Grattarola.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, May 15.—"On the Influence of Coal-dust in Colliery Explosions, No. V." By W. Galloway. Communicated by R. H. Scott, F.R.S.

At the beginning of the first paper on this subject, which I had the honour of reading before the Fellows of the Royal Society now somewhat more than eight years ago (*Proc. Roy. Soc.*, vol. xxiv. p. 354), I gave a short account of what appeared to me to be a rational mode of explaining the occurrence of all great explosions in dry and dusty collieries; and since then I have had opportunities of studying several remarkable instances of this class of phenomena, with the result that I am now more than ever satisfied with the correctness of the views which I then expressed. It is true, as some subsequent writers, among whom I may name Sir Frederick Abel, F.R.S., have observed, that coal-dust had been previously recognised as a factor in colliery explosions. I think I may safely claim, however, that no earlier author had gone the length of crediting it with the *rôle* of principal agent, and relegating fire-damp to a secondary position.

It is also admitted, I believe, by every one familiar with the subject, that my experiments with mixtures of coal-dust and air containing a small proportion of fire-damp were original. Similar experiments were subsequently made by members of the North of England Institute of Mining and Mechanical Engineers, by a committee of the Chesterfield Institute of Engineers, by Prof. Abel on behalf of the Home Office and the Royal Commission on Accidents in Mines, and by others in this country, by MM. Mallard and Le Chatelier for the Commission du Grisou in France, and by others on the Continent, all of which led to the same conclusion, namely, that air containing too small a proportion of fire-damp to render it inflammable at ordinary pressure and temperature becomes so when coal-dust is added to it. Differences of opinion were expressed as to the actual proportion of fire-damp, the comparative fineness of the coal-dust, and the quality of the coal necessary to the attainment of this result, but the general conclusion, in every case, was the one I have stated above.

In my first paper, already referred to, I had said: "If it could be shown therefore, that a mixture of air and coal-dust is inflammable at ordinary pressure and temperature, there could be no difficulty in accounting for the extent and violence of many explosions which have occurred in mines in which no large accumulations of fire-damp were known to exist," and, immediately following these words, I gave what appears to me to be a new hypothesis regarding the mode of occurrence of great colliery explosions.

My reasons for thinking it necessary to show that a mixture of air and coal-dust alone is inflammable were, first, that after some great explosions it was found that the flame had passed through very long galleries, containing presumably nothing but pure air, and of course dry coal-dust in a state of greater or less purity; and secondly, it was impossible to account for certain other explosions, except on the supposition that they had been originated by the firing of a shot in pure air in galleries containing dry coal-dust as in the last case. To have proved that a mixture of air, coal-dust, and fire-damp is inflammable did not appear to me fully to meet the case, and it was for this reason that I made further experiments with the help of a grant made to me by the Lords of Committee of Council on Education at the recommendation of this Society. The results have been described in some of the former papers of this series. In making these experiments, and in drawing certain conclusions from them, all favourable to the hypothesis referred to, I was simply carrying out the details of the work then begun, and nothing more.

In former papers I referred to several great explosions which had come under my own immediate observation. In particular I had made a very careful and complete examination of Penygraig Colliery after the explosion there in December 1880 (*Proc.*

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Roy. Soc., vol. xxxii. p. 454), when I found that the flame had penetrated into every working place in the mine. The plan which accompanies No. III. paper shows that all the working places were ventilated by what was, practically, a single current of air. It was, therefore, open to those who attribute every great explosion to the occurrence of a sudden outburst of fire-damp, and, as the annals of mining show, they constituted a very large majority before the appearance of my first paper on coal-dust, to say that this explosion was due to the same cause. For this reason I have paid particular attention to the phenomena due to the explosion which occurred at Dinas Colliery on January 13, 1879. I do not propose to enter into the minute details of this case, as I should to a large extent simply be repeating what I stated about Penygraig explosion, but will confine myself to those which are necessary or new. I had frequently inspected the workings before the explosion, and I have done so at intervals of one month or less since then, so that I have been intimately acquainted with all the conditions of the mine for many years. I know also that no sudden outburst of fire-damp has ever been known to take place in it. The workings were naturally very dry, the temperature ranging from 75° to 82° F., and the floor was covered with coal-dust. Shot firing was carried on by night when the explosion happened. The damage done by the explosion was very great, the workings being wrecked to such an extent as to lead to their temporary abandonment. They were reopened after a large expenditure of time and labour, and it was only towards the end of last year that I was able to inspect one of the districts of working places, and early in the present year that I could get into the other. With the exception of some burnt hay or dried grass which I found in one of the return air-ways, I saw no traces of burning nor deposits of coked coal-dust in any of the main road-ways, but I found well-marked deposits of coked coal dust in all the working places in both districts of workings as far as I was able to penetrate. The plan shows that the current of fresh air which came down the downcast shaft was split up into three separate currents. The two districts were thus ventilated quite independently of each other, and it was therefore impossible for any outburst of fire damp which might take place in one of them to affect the quality of the air in the other.

We are thus compelled to fall back upon some other mode of explanation in this case, and I now submit that in the present, and in my previous papers, I have brought forward sufficient evidence to show that the coal-dust hypothesis is the only tenable one. If it be admitted, however, that this hypothesis is applicable to Dinas explosion, the conclusion is inevitable that, *cæteris paribus*, it is equally applicable to every case of the same kind that has ever occurred.

Zoological Society, June 3.—Prof. A. Newton, F.R.S., vice-president, in the chair.—A letter was read from Mr. Albert A. C. Le Souëf, C.M.Z.S., of the Zoological Gardens, Melbourne, giving an account of the unusual occurrence of two young ones being produced from one egg laid by a black-necked swan. The writer described the appearance of these cygnets, which were much smaller than a companion bird of the same age.—Mr. F. E. Beddard read a paper upon the visceral anatomy of *Hapalemur griseus*, and called attention to the various points of difference between this species and *Hapalemur simus*.—Mr. A. D. Bartlett read a paper on some singular hybrids of bovine animals bred in the Society's Gardens.—Mr. G. E. Dobson, F.R.S., read a paper on the unimportance of the presence or absence of the hallux as a generic character in Mammalia, as evidenced by the gradual disappearance of this digit within the limits of a single genus (*Erinaceus*).—A communication was read from Mr. H. W. Bates, containing a list of the Coleoptera of the families Carabidæ and Scarabæidæ collected by the late Mr. W. A. Forbes on the Lower Niger. Of these three appeared to be previously undescribed.—Dr. Carl Lumholtz read a paper containing notes upon some mammals which he had recently discovered in Queensland.

Anthropological Institute, May 13.—Prof. Flower, F.R.S., president, in the chair.—Dr. Maxwell T. Masters exhibited a series of agricultural implements brought by Mr. Livesay from the Naga Hills, at the north-east corner of Assam. The tools were chiefly such as are used for rice culture on the irrigated slopes of the hills, and consisted of rakes made of bamboo and wood, a hoe and iron knife with wooden sheath and cord for suspension.—Dr. J. Stephens sent a drawing of a large pointed palæolithic implement recently found near Reading, length 9¼ inches, weight 2 lbs. 3¾ oz.—Mr. W. G. Smith exhibited two palæolithic implements recently found in North London. One was made of quartzite, and is the first example of this material met with in the London gravels; the other was a white implement from the "trail and warp." He also exhibited two white porcellaneous palæolithic flakes replaced on to their original blocks; the four pieces were found by him in North London, wide distances apart, at different times during the last six years.—Mr. Smith also exhibited a large axe from New Guinea with a keen blade of siliceous schist or banded chert, 9⅝ inches long, and weighing over 2¼ lbs. The axe was sent home by a sailor, and Mr. Smith purchased it of a person who was using it in North London for chopping up firewood.—A paper on the ethnology of the Andaman Islands, by Mr. E. H. Man was read.—Prof. Flower read some additional observations on the osteology of the natives of the Andaman Islands. Since reading a paper before the Institute on the same subject in 1879, the author had had the opportunity of examining ten additional skeletons, two of which are in the Museum of the University of Oxford, and eight in the Barnard Davis Collection now in the Museum of the Royal College of Surgeons. Five are males and five females, and all are adult. The measurements of these specimens have thoroughly established the fact that the twelve skulls of each sex previously examined furnished a very fair average of the characters of the race.

CAMBRIDGE

Philosophical Society, April 28.—Mr. Glaisher, president, in the chair.—The following communications were made to the Society:—By Mr. R. T. Glazebrook, on the electro-magnetic theory of light.—By Mr. A. H. Leahy, on the pulsation of spheres in an elastic medium. The problem of two pulsating spheres in an incompressible fluid has been discussed by several writers. The author considers the analogous problem in the case in which the medium surrounding the spheres has the properties of an elastic solid. He finds that the most important term in the expression of the law of force between the two spheres varies inversely as the square of the distance between them. This force will be an attraction if the spheres be in unlike phases, a repulsion if they be in like phases at any instant. The next term in the expression varies inversely as the cube of the distance between the two spheres, and is always a repulsion.

EDINBURGH

Royal Society, June 2.—Sheriff Forbes Irvine in the chair.—Prof. Tait communicated a paper by the Rev. T. P. Kirkman on the enumeration, description, and construction of knots. The paper described the application of a particular set of the polyhedra investigated by the author to the investigation of the subject.—Prof. Tait then read the second part of a former paper of his own on knots. He first considered the modification required to be made on Mr. Kirkman's diagrams so that they might represent actual knots. He also took up the question of the identity of some of the figures with the view of determining the actual number of different knots having a given number of crossings. Finally he recurred to the problem of beknottedness, showing how it was to be determined in any case upon the consideration that *locking* may occur with two strings, and even with one, as well as with three.—Mr. John Aitken read a second note on the recent sunsets, showing how all the phenomena observed received a satisfactory explanation on the hypothesis that they resulted from the presence of abnormal quantities of dust particles in the air. He pointed out that the facts considered adverse to this conclusion really furnished additional proof.—Mr. Aitken then read a paper on thermometer screens, which gave rise to an animated discussion.

DUBLIN

Royal Society, May 19.—Section of Physical and Experimental Science.—G. F. Fitzgerald, F.R.S., in the chair.—On the pitch-curves of cogged wheels, by A. H. Curtis, LL.D. The author showed that a pitch-curve A, *of any form*, its axis a, and also the axis b of the corresponding pitch-curve B, being given, the curve B must be such that, if it roll without sliding on A (the initial point of contact c being of points which in working would come together), carrying b with it, the roulette thus described by b will be a circle having a for centre; hence he deduced the known result that the point of contact of the pitch-curves must be situated on $a\,b$—for the tangent at b to the roulette must be perpendicular to $b\,c$, while, as this roulette is a circle, this tangent must also be perpendicular to $a\,b$; he proved that, if $p = \phi(r)$ be the equation of A, $p' = \frac{r'}{\kappa - r'}\phi(\kappa - r')$,

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where κ = length $a\,b$, will be the equation of B. He mentioned also that Prof. Willis had proved that *all* working teeth on corresponding pitch-curves are roulettes of the same curve and generated by the same point, and also that, with circular pitch-curves, teeth which were involutes of circles concentric respectively with the corresponding pitch-curves, and having the same centre of similitude with them, would work correctly, and stated that these theorems taken together had suggested to him the question, What curve rolling on a circle will generate, and by what point, the involute of a concentric circle? This curve he proved to be an equilateral spiral whose pole is the generating point.—On the alleged effect of magnetism on the human body, by Prof. W. F. Barrett. In a recent address Sir W. Thomson drew attention to the "marvellous fact" that a powerful magnetic field appeared to exert no action on the human body, and stated his conviction that, "if there is not a distinct magnetic sense, it is a very great wonder that there is not." The object of the present paper was to describe certain facts which had come under the author's observation, and which pointed in the direction of a distinct sensory and therapeutic effect produced by a powerful electro-magnet upon certain individuals. A careful examination of upwards of 100 persons had led to the discovery of three individuals who could instantly detect by their sensations when the current was put on or taken off a large electro-magnet, between the poles of which their heads had been placed. In an absolutely darkened room a singular luminous glare was also seen over the magnetic poles by these three observers. Every care was taken to avoid collusion or chance coincidence, and the observers had no means of knowing by any other means when the current was put "on" or "off." If a distinct magnetic sense exist, as these experiments seem to suggest, it is doubtless rare and fitful, depending possibly on the state of the percipient's health. The author then described experiments that had been made by Charcot in Paris, Dr. W. H. Stone at St. Thomas's Hospital, London, and Prof. Dreschfeld at the Manchester Infirmary, to ascertain the pathological effect of a powerful magnet. The two former authorities had noticed the transference of sensation produced by magnetism in patients suffering from hysteria or hemi-anæsthesia, under conditions which appeared to preclude the possibility of imagination coming into play. Dr. Dreschfeld describes three cases which came under his own observation where anæsthesia was cured by a large electro-magnet. In one case, particulars of which were published in the *British Medical Journal*, every care was taken to eliminate causes other than the specific effect of magnetism, and there seemed no doubt that the patient's complete restoration to health was due to the latter cause alone. In conclusion Prof. Barrett remarked that should the therapeutic value of magnetism in certain specific disorders be established, it would obviously give no support to certain magnetic appliances which are sold as nostrums for all diseases, and of the specific value of which he was not aware that there exists the smallest medical evidence.—On the substitution of sodium bichromate for the potassium salt in bichromate batteries, by Prof. W. F. Barrett. Prof. Barrett stated that a week or two ago Mr. Moss placed in his hands a specimen of bichromate of soda, and asked him to try whether it would efficiently replace the potash salt which is invariably employed in bichromate cells. The result of his examination showed that there was no appreciable difference between the electromotive force, the internal resistance, and the constancy of the two cells, charged with equal weights of the soda and of the potash salt respectively.—Reply to the criticisms of M. Lœwy, by Howard Grubb, F.R.S. (see NATURE for May 29, p. 100).

Section of Natural Science.—V. Ball, F.R.S., in the chair.—On the origin of freshwater faunæ, a study in evolution, by Prof. W. J. Sollas, D.Sc., F.G.S. The poverty of freshwater faunæ as compared with marine is commonly attributed to a supposed inadaptability on the part of marine organisms to existence in fresh water. That this explanation is inadequate is shown by the existence of freshwater jelly-fish such as *Limnocodium*, and still more directly by the experiments of Beudant, who succeeded in accustoming several kinds of marine mollusca to a freshwater habitat. The view of Von Martens that the severity of a freshwater climate is prohibitive of the existence of most marine forms in rivers is insufficient, and a more thoroughgoing explanation is necessary. This is to be found in a study of the means by which the distribution of marine animals is secured. In the case of stationary forms free-swimming embryos are distributed over wide areas by currents, and they can never pass from the sea into rivers, in which the current is always directed seawards. Nor, probably, could an attached form once introduced into a river permanently establish itself so long as its propagation took place exclusively through free-swimming larvæ, for these would gradually be borne out to sea. Hence, freshwater animals should not, as a rule, pass through a free larval stage of existence, nor, as a matter of fact, do they. In Hydra, freshwater sponges, and Polyzoa, the young usually emerge from a horny cyst in the complete state. In the Unionidæ, the glochidium stage provides for distribution without involving a seaward journey. The young of freshwater mollusks do not enter upon a free existence till they are similar to their parents, and Paludina is viviparous. The suppression of a free-swimming larval stage not only occurs in freshwater but in many marine invertebrates. This is connected with the fact that the larval stage is in a position of disadvantage as compared with the adult. Hence there is an advantage to the organism if the larval stage can be passed over in a state of seclusion. From this various other modifications follow; development in seclusion involves a supply of accessible food, hence the appearance of yelk and other kinds of nourishment furnished by the parent to the imprisoned embryo. Again, the secluded larva being spared the drudgery of working for its own existence, and supplied with nutriment in a form that puts the least tax on its digestive powers, a larger balance of energy remains available for metamorphic changes. Thus arise the phenomena of accelerated and abbreviated development. Further, the shortening of the larval life probably leads to the lengthening of the adult life, and shifts the chances of variation and selection forward into the adult stage. Thus animals which hatch out in a complete state will most probably suffer modifications of that state, and not of previous ones, except very indirectly. Here we discover a direct tendency towards a mode of development which explains the "arborescent" character of our zoological classifications, *i.e.* the tendency of the tree of life is now to produce leaves rather than new branches. In the case of freshwater fauna very direct reasons have existed for the suppression of the free larval stage. In this connection may be noticed the richness in species and the poverty in genera of the freshwater mollusca. In discussing the origin of freshwater faunæ there are three hypotheses from which we have to select: (1) that marine forms have migrated into rivers; (2) that they have migrated into marshes and thence into rivers; and (3) that marine areas have been converted into freshwater ones. The last course has been the most usual, especially in the case of non-locomotive forms. Hence the origin of freshwater invertebrates is connected with the great movements which have affected the earth's crust. The earliest well-known lacustrine areas are those of the Old Red Sandstone, in one of which we meet with the earliest known freshwater mollusk, *Anodonta jukesii* (Forbes). The lakes of the Permo-Triassic period contributed additions to the freshwater fauna of the globe. The *Neritidæ* and *Cerithiadæ* are probably post-Palæozoic families, and, as the *Neritinæ* and *Melaniidæ* are so closely connected with them, they may be regarded as their collateral or direct descendants, and thus may have originated in Triassic lakes, but not earlier. Other genera probably arose at the same time; the occurrence in Cretaceous deposits of *Unio*, *Physa*, *Valvata*, and *Lymnea* in the Nearctic, Palæarctic, and Oriental regions, suggests a high antiquity for these genera; and they may have existed in Palæozoic times. The lakes of the Tertiary period furnished probably further contributions to our freshwater fauna, such as *Lithoglyphus* and *Dreissena*. Thus, existing freshwater genera are probably descended from marine forms which became metamorphosed in the waters of the Devonian, Triassic, and Tertiary lakes. In the lakes of Central Africa the Tertiary freshwater fauna still survives, nearly all of the genera from Lake Tanganyika being referable to genera already in existence in Mesozoic and Tertiary times. The lakes of the Northern Hemisphere received on subsiding beneath the glacial sea such Arctic forms as *Mysis relicta* and *Pontoporeia affinis*, but most of their existing inhabitants have re-entered them since their emergence from the sea.

PARIS

Academy of Sciences, May 26.—M. Rolland, president, in the chair.—Observations of the small planets made with the great meridian instrument of the Paris Observatory during the first three months of the year 1884; communicated by M. Mouchez. The observations of January 11, February 11 and 12, March 14 and 15, were made by M. P. Puiseux, all the rest by M. H. Renan.—Remarks on the sense of sight in its relations with different colours placed in juxtaposition, by M. Chevreul.—Fresh experiments made with a view to determine the locality

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and mode of formation of urea in the animal system, by MM. Gréhant and Quinquaud. From these experiments, which consisted mainly in making a quantitative analysis of the urea in the blood flowing to and from a given organ, the authors infer that the abdominal viscera are the seat of a continuous formation of urea.—Experimental studies on the anæsthetic properties of the chloruretted derivatives of formine, by MM. J. Regnauld and Villejean.—On the theory of quaternions: a demonstration of Sylvester's proposition that the theory of quaternions is identical with the theory of binary matrices, by M. Ed. Weyr.—On the circulation of the liquid mass of the sun, by M. P. Lamey. Assuming as a postulate the total fluidity of the solar mass, the author endeavours to show that, in virtue of the continuous cooling of the surface layer, the whole volume must be in constant circulation, and that the circuit thence resulting may be represented by a simple geometrical figure, which has several points at a tangent with the surface of the solar globe.—Note on the electric conductivity of the liquid and solid anhydrous salts, by M. Foussereau.—On the gaseous tensions of liquid amalgams, by M. Isambert.—Thermic studies of the alkaline fluosilicates: three methods of obtaining fluosilicates of potassa, soda, and lithia, by M. Ch. Truchot.—Fresh researches on bromuretted carbolic acids—their melting heat, specific heat, and heat of neutralisation, by M. E. Werner.—On some reactions of albumen, by M. E. Grimaux.—Analytical study of the chief mineral fertilisers contained in arable lands, by M. G. Lechartier.—Note on the alluvial and lacustrine formations of the basin of the Shott Melrirh, Eastern Sahara, by M. G. Rolland.—On the transformations of a parasitic Peridinian (*Gymnodinium pulvisculus*, Bergh.), by M. G. Pouchet.—A contribution to the study of the virulent principle in puerperal septicæmia, by M. S. Arloing.—On a new method of transfusion of blood previously subjected to the action of peptone, by M. Afanassiew.—On the exaggerated statements regarding the intensity of atmospheric evaporation during the spring equinox, with comparative readings of the evaporometer during the years 1873–1884, by M. L. Descroix.

June 2.—M. Rolland, president, in the chair.—Arithmetical commentary on the theorem discussed by Gauss in his "Disquisitiones," § 357, by M. de Jonquières.—Note on the theory of the winding-gear employed in extracting ores from deep mines, by M. Haton de la Goupillière.—On the mean reciprocal distances of the planets in the primordial state of the solar system; letter addressed to M. Hermite by M. Hugo Gyldén. The respective mean distances, supposed to be far less absolutely than at present, are determined as under:—Mercury, 0·443; Venus, 0·519; Earth, 0·562; Mars, 0·625; Jupiter, 0·850; Saturn, 0·988; Uranus, 1·177; Neptune, 1·322.—Explanation of a method of determining the temperature of the parts of the sun below the photosphere, by M. Hirn.—Fermentation of saccharine juices; experimental researches on the influence of the pneumatic treatment by a current of purified air at the ordinary temperature, or heated to 65° C., by M. P. Calliburcès.—Suggestions for constructing a mercurial galvanometer (hydrostatic galvanometer), by M. J. Carpentier. The paper refers to experiments made as early as January 1881, and are here reproduced as having preceded the apparatus of a similar character submitted to the Academy by M. Lippmann on May 19, 1884.—On the reaction of fused gold and silver in the vapour of phosphorus, by MM. P. Hautefeuille and A. Perrey.—On the action of the sulphuret of mercury on the sulphuret of potassium, by M. A. Ditte.—Note on the combination of chlorides of gold with chlorides of phosphorus by M. L. Lindet.—On the anatomy and nervous system of the Australasian Gasteropod, *Parmophorus australis* (*Scutus*), by M. Boutan.—Contributions to the natural history of the Haliotides, by M. H. Wegmann. The author, who had previously submitted a study of their nervous system, here completes the subject by a full anatomical description of these animals.—Account of the freshwater *Lithoderma fontanum*, Nob., a species of brown Alga (Melanophyceæ) from Montpellier, by M. Ch. Flahault.—On a new genus of vegetable fossils discovered by M. Fayol in the coal-mines of Commentry, by MM. B. Renault and R. Zeiller. The authors, who, from their discoverer, propose the generic name of Fayolia for these plants, give full-size illustrations of two species, *F. dentata* and *F. grandis*.—On some new types of rocks from the volcanic Mount Dore (Clermont), with a description of the successive formations in that district, by M. A. Michel Lévy.—Hydrology of the Ohio Basin, in connection with the recent disastrous inundations in that region, with map, by MM. Fr. Mahan and G. Lemoine.—On the pseudo-meningitis (pseudo-meningitis otopiesis) observed in young deaf-and-dumb subjects, by M. Boucheron.

VIENNA

Imperial Academy of Sciences, May 8.—R. Latzel, on the Myriopoda of the Austro-Hungarian Empire (containing the description of Symphyleæ, Ponropoda, Diplopoda).—K. Deschmann, on the tumuli of Rovisce in the parish of Bründl in Lower Carniola.—L. Boltzmann, on the possibility of basing a kinetic theory of gases on attractive forces alone.—P. Czermak, on the value of some integrals of Maxwell's theory of gases based on a certain law of forces.—F. Zehden, method for calculating a true moon distance by an observed one.—E. Zuckerkandl, on the apparatus of circulation in the nasal mucous membrane.—F. Rimmer, experiments on nutations and directions of growth of seed-plants.—T. Habermann, on diethylalizarin-ether.—F. Fiala, on some mixed ethers of hydroquinone.

May 15.—A. Rollett, contribution to a knowledge of the process of contraction in striated muscles.—F. Kolacek, on a method for determining the electric conductivity of liquids.—A. G. Nathorit, remarks on Herr von Ettingshausen's essay, "On the Tertiary Flora of Japan."—C. Langer, on the origin of the internal jugular vein.—D. Lersch, notes on comets.—E. von Hœrdtl, contributions to Assyrian chronology.

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